

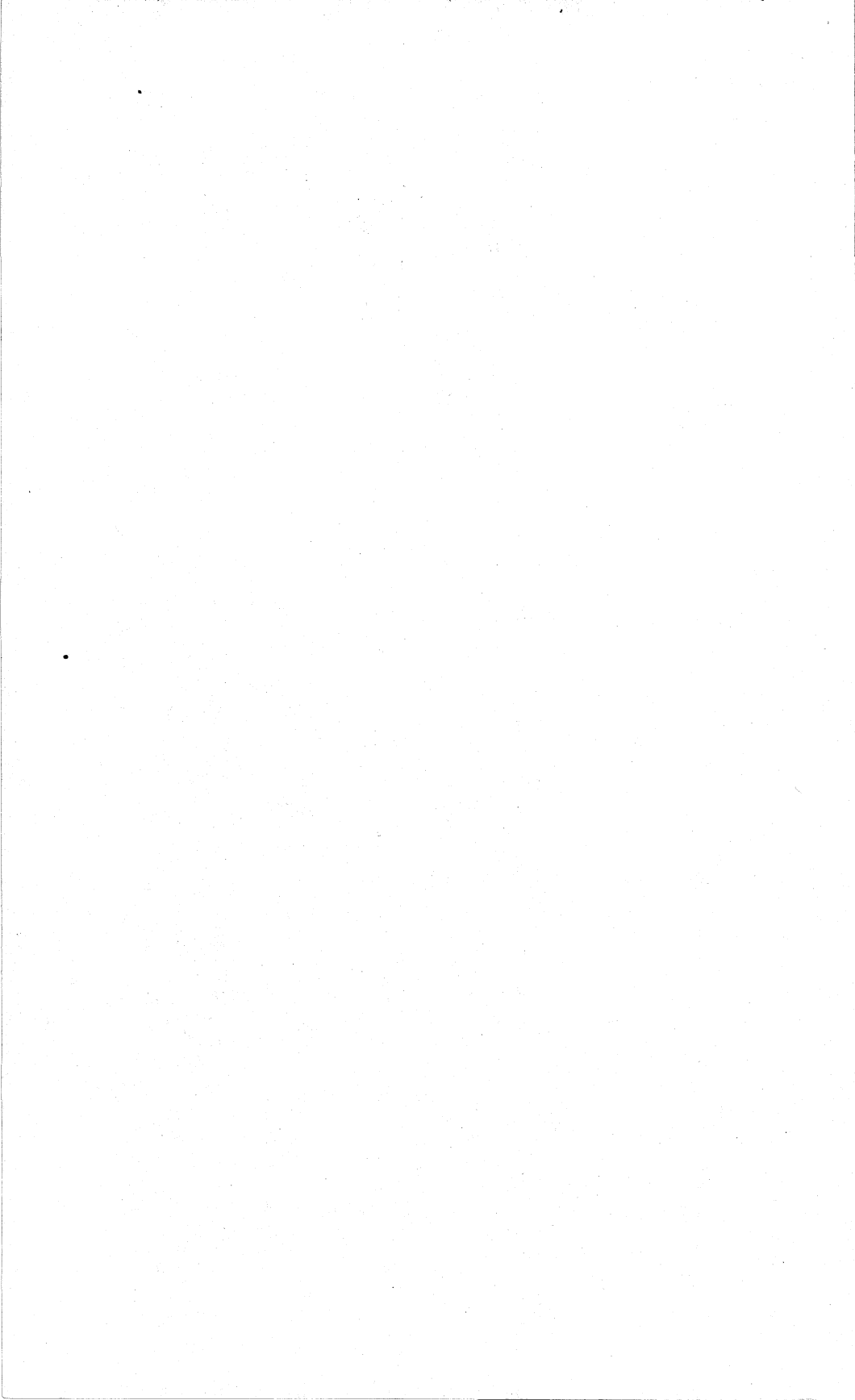
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Feedlot and Ranch Equipment for Beef Cattle





CONTENTS

	PAGE
Pasture or range equipment shelter -----	2
Sheds -----	2
Shade shelters -----	2
Windbreaks -----	3
Back rubbers -----	3
Cattle guards -----	4
Feedlot equipment -----	5
Silos -----	8
Feeding equipment -----	9
Hay -----	9
Water tanks -----	10
Corral equipment -----	11
Scales -----	12
Chutes -----	15
Loading chute -----	16
Control of runoff from feedlots -----	17

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Feedlot and Ranch Equipment for Beef Cattle

Prepared by Russell E. Larson, Research Leader, and Richard O. Hegg,¹ Agricultural Engineers, Farmstead Engineering, University of Minnesota, St. Paul, Minn. 55108

Proper equipment and housing are important in a successful beef cattle operation. These items need not be elaborate or expensive, but should be practical and designed in such a way as to resist damage from the pushing and butting activities of the animals and to provide maximum safety to both man and animal.

Shelters, shades, windbreaks, corrals, fences, and many other animal handling facilities may be

designed and constructed on the farm or ranch. Many stockmen prefer durable wooden materials for construction of routine buildings and equipment.

In areas where used pipe, tubing, steel cable, and other construction metals are available at a reasonable cost, such items are widely used as construction materials. In addition to durability, metal construction offers the additional advantage of greater strength, and when properly designed, greater safety.

¹ Retired, ARS.

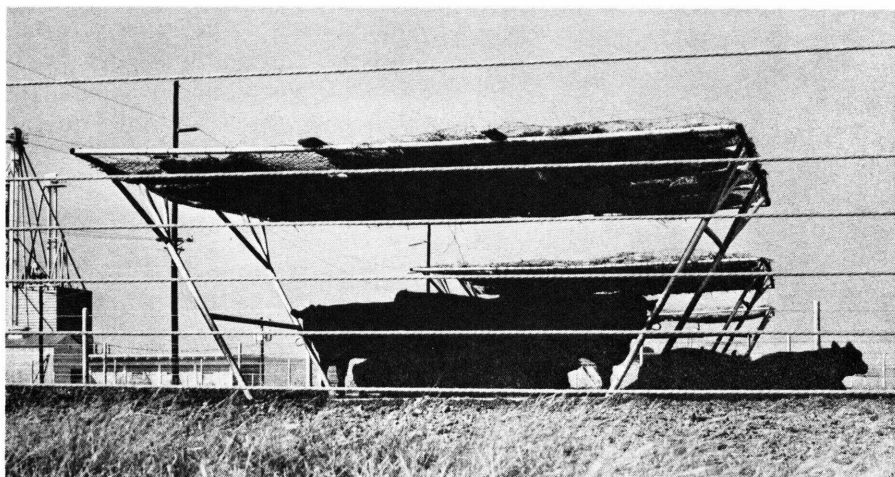


Figure 1.—Shade shelter constructed of wire and pipe in a commercial feedlot.

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Many farm and ranch operators possess metal working and welding skills. When such skills are available, the design and construction of many animal handling items can be done on the farm and ranch. In many cases salvaged metal pipe, tubing, and other construction materials can be used to good advantage.

Animal handling items such as working chutes, headgates, and calf tables are available from commercial manufacturers. These items are usually well constructed from durable metals. In some cases, they may be more satisfactory and economical than shop-made equipment.

PASTURE OR RANGE EQUIPMENT SHELTER

Sheds

Beef animals should be adequately protected from extreme cold and humid conditions. In warmer and less humid climates, natural shelters such as timber, embankments, and canyons usually provide adequate protection.

Mature beef animals require approximately 40 square feet of shelter space per head, whereas calves and yearlings will need 20 to 30 square feet per animal. Beef animals do not require a closed shelter, except under extreme weather conditions. Open sheds, located on well-drained areas with a southern exposure, are most desirable.

Pole-type construction is adequate and is usually more economical than structures made with concrete or masonry foundations. Standard wood or metal siding is normally used on three sides of the shed. When metal siding is used, adequate framing should be provided to protect the metal from crowding by animals.

Conventional roof types that provide adequate protection and resistance to wind and other stresses are recommended. It is a good idea to include a standard metal roof gutter along the open portion of the shed.

Because shelter sheds serve as shade areas during the summer months it is helpful to design portions of the closed sides so they can be opened easily to facilitate air movement.

Shelter sheds, as described above, are usually adequate in northern and midwestern sections of the United States. However, feedlot operators in the southern and southwestern areas normally make no provision for shelter of their animals during winter months.

Shade Shelters

Shade is important in either feedlots or pastures where summer temperatures reach 80° to 85° F. In many pastures shade from trees is adequate. In the absence of trees, some form of artificial shade is desirable, if animals are to maintain normal growth and fattening rates.

Shade shelter should be located so as to take advantage of normal wind movement. An elevated ground area with the roof located 10 to 12 feet above ground is desirable. Low-quality cured roughages such as straw and hay are very effective roof materials but require replacement every one to four years.

Durable roof material such as sheet metal roofing will provide a more permanent shade roof. The application of a reflective paint to a galvanized iron roof will increase its effectiveness and add to its durability.

Windbreaks

Windbreaks are useful for beef cattle feedlots in cold climates. Natural occurring windbreaks, such as timber and earth embankments, are usually adequate if present. When natural protection is not available some form of artificial windbreak is desirable. A suitable windbreak can be constructed by building an 8-foot-

high wall from either wood or metal. The wall covering can be solid or semisolid. The solid wall will permit the snow to pile deeper and closer to the windbreak. The semisolid wall permits air to pass through and tends to spread the snow. Normally, a wall along a portion of north and west side is preferred to a wall on only one side of the lot.

Support framework for windbreaks should be adequate to withstand both wind stress and animal crowding. Six-inch pressure-treated wood posts or 3- or 4-inch pipe, 8 feet in length, is usually suitable to support a windbreak fence. Wood posts should be set 3 feet in the ground 6 to 8 feet apart. Pipe posts have greater stability if set in concrete.

Back Rubbers

Moderate control of horn flies and cattle lice can be accomplished by the use of simple back rubbing devices treated with an



Figure 2.—Shade shelter suitable for feedlot or pasture areas.

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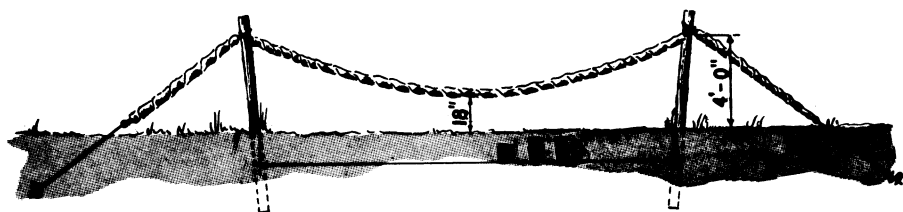


Figure 3.—Back rubber.

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approved insecticide. A simple applicator that animals will use can be constructed on most farms and ranches.

Materials for construction of back rubbers include two 7-foot fence posts and suitable length of chain or wire cable. Set the posts 15 to 20 feet apart and approximately 3 feet in the ground. Securely fasten the chain or cable approximately 4 feet above ground level. Allow chain or cable to sag to within 18 inches of the ground at the center.

Anchor the post securely to a "deadman" opposite the chain or cable. Wrap the chain or cable with several thicknesses of burlap and tie securely with heavy cord or wire. Saturate the burlap weekly with an approved insecticide during periods when flies and cattle lice are a problem.

Commercial cattle oilers and dust applicators are available from standard manufacturers. Many styles and forms are available and when properly used are satisfactory.

The back-rubbing device should be located in an area of the pasture where the animals fre-

quently gather. Artificial shades or watering areas are good location sites for the device. The back rubber should be located in an area that is protected from the direct sunlight.

To maintain normal control of either horn flies or cattle lice with these devices, attention must be given to the condition of the applicator weekly. In cases of extreme insect population other methods of control may be required.

Cattle Guards

Cattle guards or auto gates, located between pastures or confinement areas on frequently traveled roads, save time and labor. They permit passage of ordinary motor vehicles, whereas most livestock will not attempt to cross the guard. When a cattle guard is located on roads where animals are normally moved from one pasture to another, a standard gate should be located nearby so as to permit passage of the livestock.

Cattle guards may be constructed from treated timbers or more

Caution

Paint containing lead should not be used as a preservative on cattle equipment or on buildings that are accessible to the cattle. Lead poisoning may result when animals lick or chew objects painted with lead-containing paints. Young animals are especially susceptible. Oxidized lead paints are attractive to calves and may cause many unexplained calf losses.

durable materials. In areas where used pipe or tubing is available, such items are widely used to construct durable cattle guards. Also discarded railroad rails are sometimes used.

Cattle guards should be large enough to provide adequate passage of motor vehicles and to turn livestock. A well-drained pit beneath the guard is desirable. This

aids in maintenance and in preventing livestock from attempting to cross the structure.

FEEDLOT EQUIPMENT

The establishment of large-capacity cattle feeding facilities in the West and Southwest in recent years has resulted in marked changes in cattle feedlots. Furthermore, the effect of large numbers of animals on air and water quality has led to a reassessment of the location, design, and development of feedlots.

There are basic elements in the design and location of feedlots that are important regardless of size. The location should be well drained, convenient to feed supply, and readily accessible to mechanized equipment. Consideration must be given to the possible pollution effect of runoff water on the surrounding watershed and natural waterways.

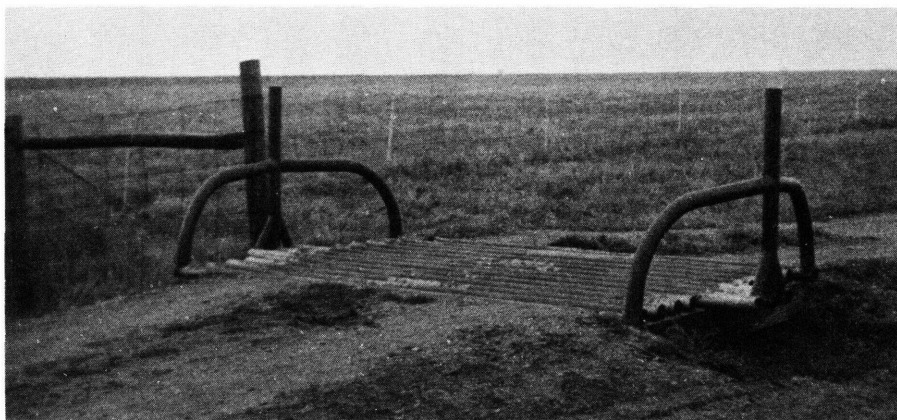


Figure 4.—Metal cattle guards constructed from piping.

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Concentrate feeds and chopped roughages are normally fed from self-unloading feed wagons or trucks. Mechanical conveyors are

Fence-line feed bunks are most convenient and eliminate the need to put feeding equipment in the feedlot. When self-feeders are used, they can be located adjacent



Figure 5.—Fence-line bunk construction detail.

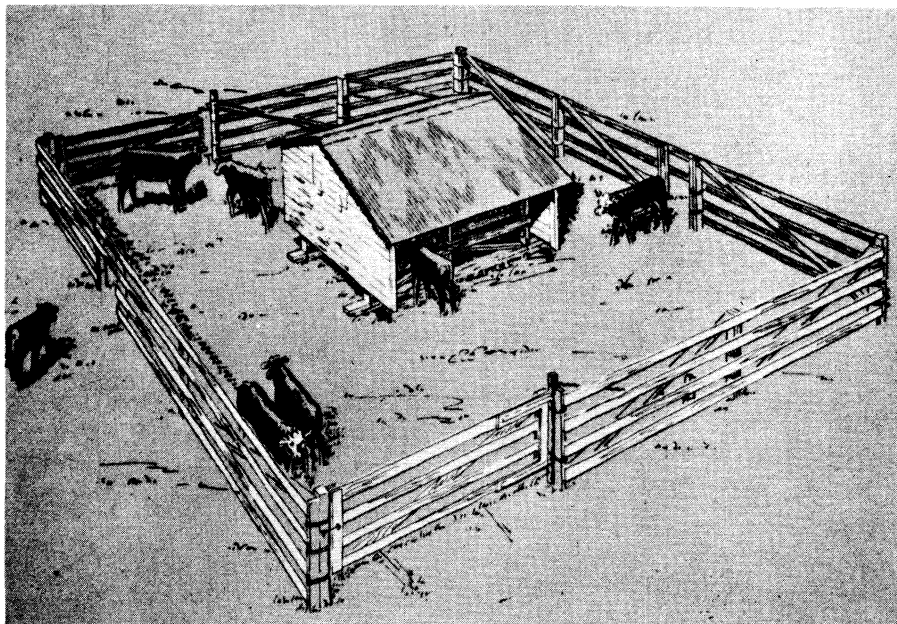


Figure 6.—Calf creep and portable self-feeder.

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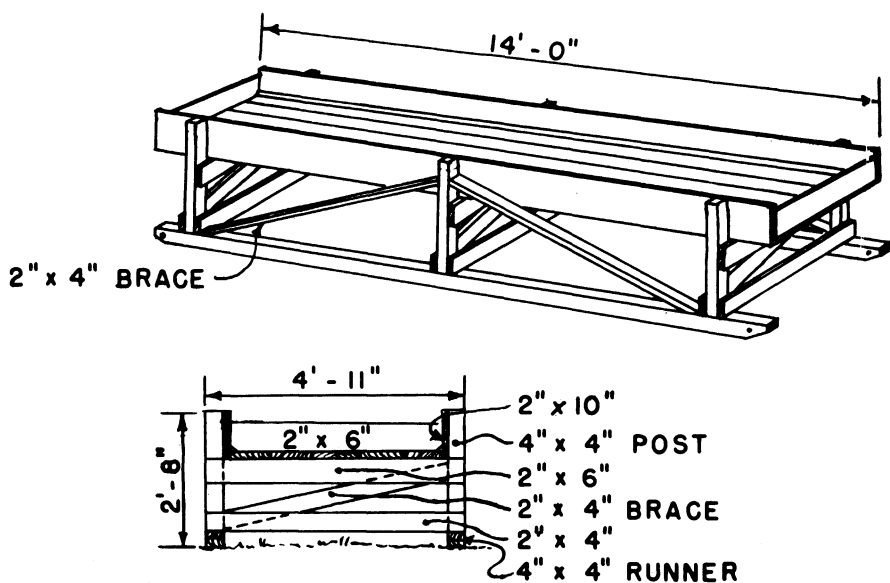


Figure 7.—Portable feed bunk.

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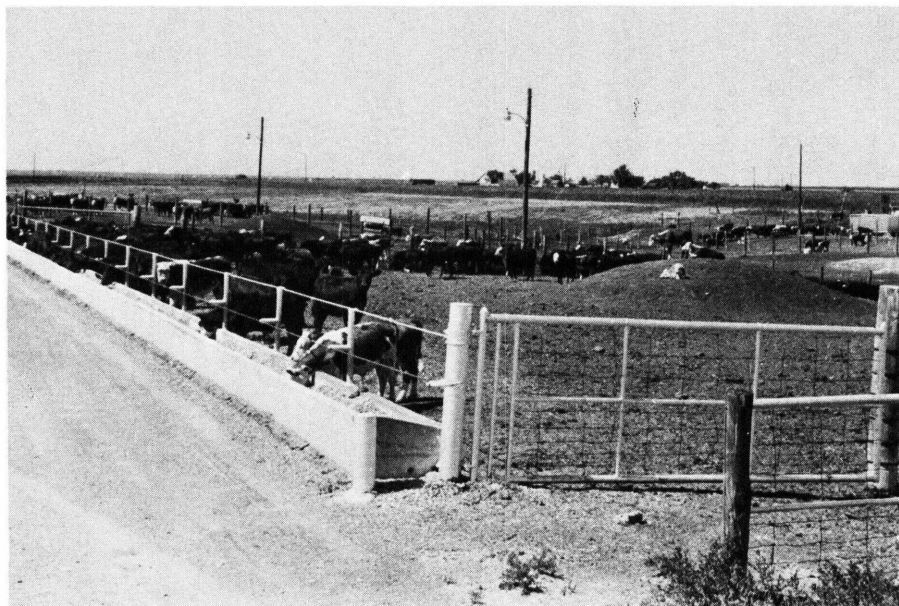


Figure 8.—Fence-line feed bunk.

2917

to the roadway so that they may be filled by mechanical equipment.

When a fence-line bunk feeder is used, each animal should be allowed 22 to 28 inches of trough space. When using a self-feeder, 12 inches of bunk space is adequate.

Silos

Silos, either permanent or temporary, are important equipment items in cattle feeding. Such structures permit the harvest and storage of maximum amounts of plant material and thereby provide an excellent source of high-quality forage.

Permanent-type silos include

any permanently walled upright or horizontal configuration. They provide for long-term storage with a minimum waste of forage. Temporary silos are ordinarily used to store limited quantities of forage for immediate use. These include bunkers, lined snow fences, and simple aboveground stacks of silage. Unless storage facilities are properly constructed and maintained, spoilage and waste of forage can be excessive.

Silos should be located on well-drained sites. This is especially important with trench and bunker stock silos.

Silo unloaders can move forage out of the silo without hand labor. They are available for almost all sizes of upright (vertical) and

bunker (horizontal) silos. For upright silos the unloaders—powered by electricity—can either be top or bottom unloading.

The bottom unloaders have the following advantages: the silo can be refilled anytime and the oldest forage is always fed first. Bunker silo unloaders are generally powered by a tractor or an auxiliary engine.

Feeding Equipment

Self-feeders are designed to provide a continuous supply of high-quality nutrients at all times. They are most commonly used as calf “creep feeders” and sometimes are used in fattening operations.

Portable feed troughs or bunks built on skids so that they can be easily moved are preferable to stationary troughs for small farms and ranches.

Feed troughs should be well braced. They should be wide enough and deep enough to prevent feed waste. For troughs, use the most durable lumber available. Care should be exercised in selecting treated lumber in order to avoid lumber treated with poisonous materials

Bunk skids and support timbers near the ground should be pressure treated. Materials for the trough floor should be well-cured lumber.

Mechanized feeding equipment greatly shortens the time required for feeding large groups of animals. Several types of hor-

izontal conveyors (augers, rubber belts, and flighted chains) are available to distribute feed uniformly from a central feed storage location into feed bunks up to several hundred feet long.

For large feedlots using fence-line bunks the self-unloading wagons or trucks are most desirable. These types of feeding equipment usually will allow the mixing of the different feed ingredients right in the wagon or truck, making a uniformly mixed ration.

Hay

Under range conditions hay is usually scattered about on the ground. Where animals are restricted to specific areas, the use of a well-designed forage rack will result in better utilization of the forage. Forage racks can be constructed from durable lumber or construction metal.

Under certain conditions a combination feed bunk-hay rack is desirable. Hay racks inside shelters should be located so that they can be filled from the hay storage area or from equipment used to haul forage.

A wide variety of hay handling equipment is available to most farmers and ranchers. Chopping, baling, or stacking are the three basic ways hay can be handled.

Chopped hay can be handled either wet (haylage) or dry by using the typical silage blowers or flighted elevators, or both.

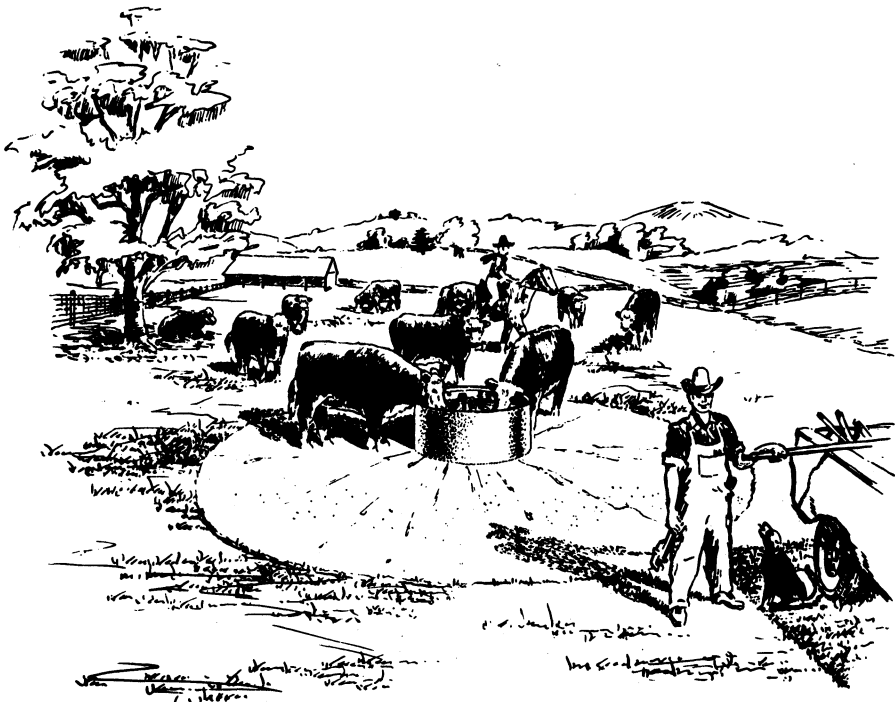


Figure 9.—Concrete watering tank.

BN-15505

Baled hay is a common method of hay handling that compresses hay into a dense package to reduce the space requirements for storage.

The type of bale falls into two main shapes: one is the cubically-shaped bale ranging in weight from 50 to 100 pounds; the other is the large round bale which ranges in weight from 1,000 to 2,000 pounds. The smaller bales are more suitable for smaller farm operations because these bales can be handled manually and no investment in bale-moving equipment is necessary.

Another method of hay handling is stacking either by hand

or by machine. The stacks are formed in the field and then moved to the farm or ranch by a stack mover, which can automatically load and unload the stack. For small operations the stacks can be moved by hand labor onto a wagon and then transported to the animals to be fed. Or the stacks can be left in the field, and the animals can eat directly from the stack.

Water Tanks

An adequate water supply is essential to a beef cattle operation. The beef animal will consume from 5 to 15 gallons of

water per day, depending on the size of animal, feed, and weather conditions. Water tanks should be located so that they are easily accessible to animals of all ages. Tanks located in the common corner or fence of two or more lots or pastures may serve several groups of cattle.

Water tanks are commonly made from galvanized metal or poured concrete. Metal tanks are usually movable from one location an another. Poured concrete tanks are more permanent and durable. Where large quantities of water must be stored, as on ranches where water is pumped from wells by windmills, a large supply tank is necessary. Smaller tanks to serve the animals are connected to the supply tanks.

When the water supply is obtained from standard pressure lines, automatic float valves are frequently used to provide a constant water level in the tanks. Such valves should be an anti-siphoning type to avoid pollution of the water system and usually require a protective guard to avoid damage by animals.

The water tank should be located on a well-drained site to avoid mudholes and facilitate draining and cleaning.

Soil erosion frequently occurs in the area immediately surrounding the water tank. To assure all animals access to a water supply it is often necessary to refill or build up the soil around the tank. This erosion can be prevented by pouring a 3- to 4-inch

concrete slab 6 to 8 feet wide around the tank.

The shape of the water tank is determined by the needs of the stockman. Round tanks require somewhat less material and help to avoid animal crowding.

In cold climates, tanks should be located in a protected area to minimize freezing. In areas of severe cold, tanks should be equipped with a heating device to ensure animals a ready source of water.

CORRAL EQUIPMENT

The design of the corral will depend on the kind and number of cattle to be handled, as well as the type of farm or ranch. For the conventional farm herd, the corral may be designed as a part of the farm barnyard. On large ranches, or where large numbers of cattle of all kinds are to be handled, the corrals should be designed and located so as to facilitate the efficient movement of large numbers of cattle in a short time.

The corral design should include provisions for a working chute, squeeze chute and head-gate, loading chute, areas for treating and spraying animals, and a dependable set of scales. A sorting or cutting alley adjacent to the holding pens is a desirable feature when large numbers of animals are to be handled.

The physical site of the corrals should be determined by pasture location and arranged to work as

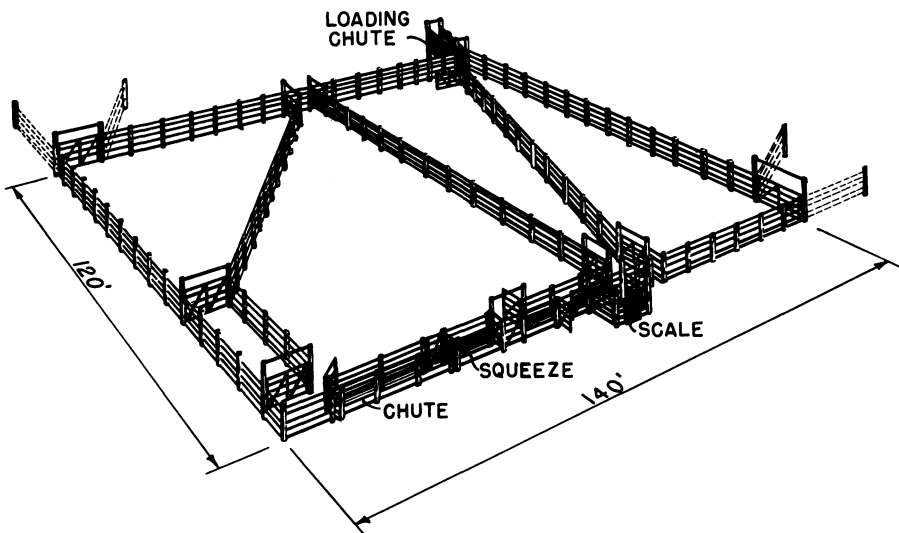


Figure 10.—Corral system for use where a small number of cuts is required.

BN-11572

many groups of cattle as possible through a common facility. The corral site should be well drained and provide shade as well as protection from winter weather. Allow 200 to 300 square feet per cow in dirt corrals. Only 20 square feet per cow is required when cows are housed in slotted floor houses. A mound of dirt or manure in the corral will permit cattle relief from mud.

Materials to construct the corral fence wall vary from section to section of the country. Wooden poles and conventional dimension lumber is the most commonly used material. In areas where suitable metal materials are available at a reasonable cost, a very attractive and durable set of corrals can be constructed from used pipe, tubing, and related ma-

terials. Posts for corral fences must be very durable.

Pressure-treated wooden posts 6 inches or more in diameter and 8 to 10 feet long are recommended. These should be set 3 feet in the ground. The fence height will depend on the kind, number, and temperament of animals to be handled. A 5½- or 6-foot fence will be adequate for most beef animals.

If dimension lumber is used, the planks should be placed on the animal side of the post. Lumber is commonly fastened to the post by heavy nails or bolts. In areas of stress, such as corners and gates, bolts or lag screws are often used to provide additional strength.

Gates should be strongly built, well braced, and hung so as to

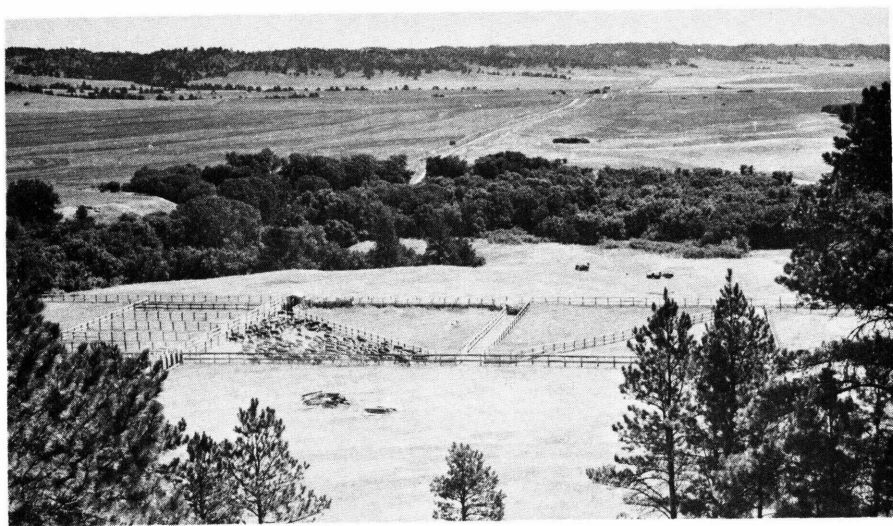


Figure 11.—Corral system for large numbers of cattle.

BN-11582



Figure 12.—Portable scales are valuable for weighing individual animals.

BN-11590

move freely. Either wooden or metal gates can be used with primary considerations being strength and durability.

Scales

A livestock scale is a valuable item of equipment for beef cattle producers. It is a necessity when

the buying and selling of animals is based on farm or ranch weights. Likewise, scales are a very valuable aid in selection of the most efficient breeding stock.

The scales should be located so that animals can be easily moved to and from them for weighing. Most stockmen prefer to locate

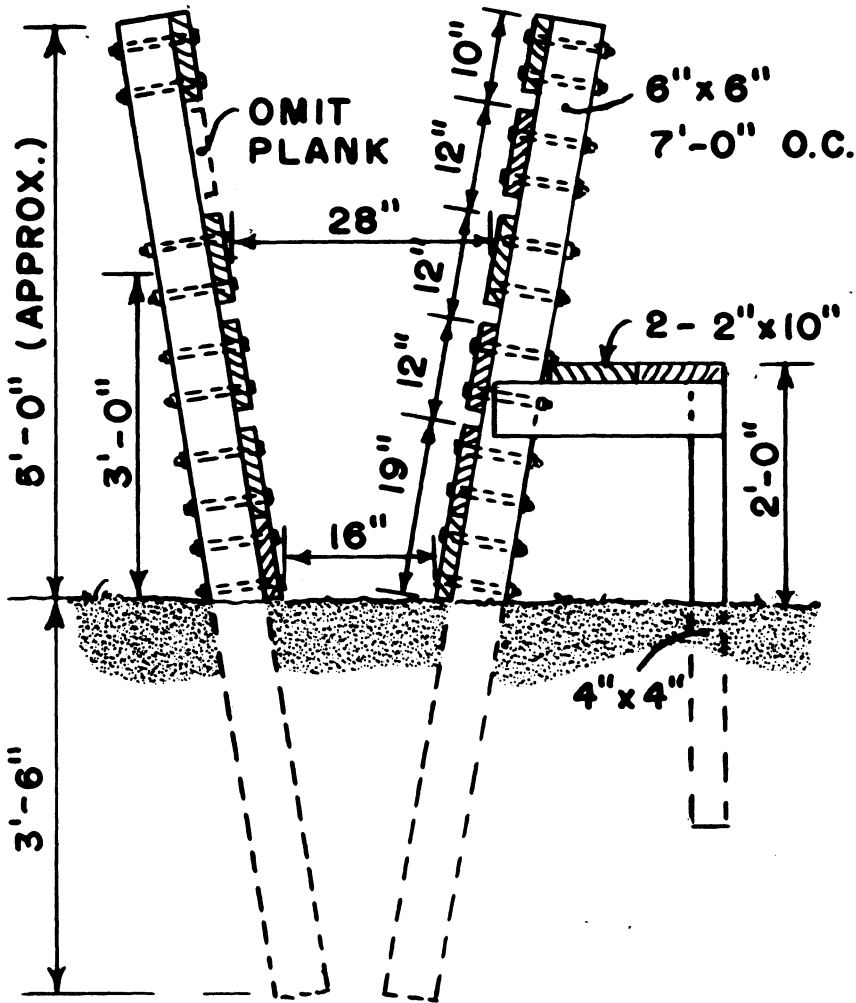


Figure 13.—Chute with sloping sides.

BN-11564

the scale in or adjacent to the working pens and loading chutes.

Livestock scales are available either as a portable unit or for permanent installation. If the stockman is to obtain accurate and reliable weights of his livestock, the installation, care, and service on a scale unit is very important.

Chutes

A well-designed working chute is one of the best investments a cattleman can make. It contributes to the safe and easy handling of animals. It assures safety to the person engaged in treating the livestock. The working chute is constructed as a part of the

animal-handling corral. The overall dimensions are determined by the number and size of animals to be handled.

The chute should be long enough to hold six or more mature cattle. When handling large numbers of animals, a chute that is slightly curved will facilitate the movement of stock. When both calves and mature animals are to be handled, a design in which the chute is narrow at the bottom and wider at the top will prevent younger animals from turning around in the chute.

Many routine vaccinations or treatments can be administered when animals are restrained in the ordinary chute. However,



Figure 14.—Curved chute.

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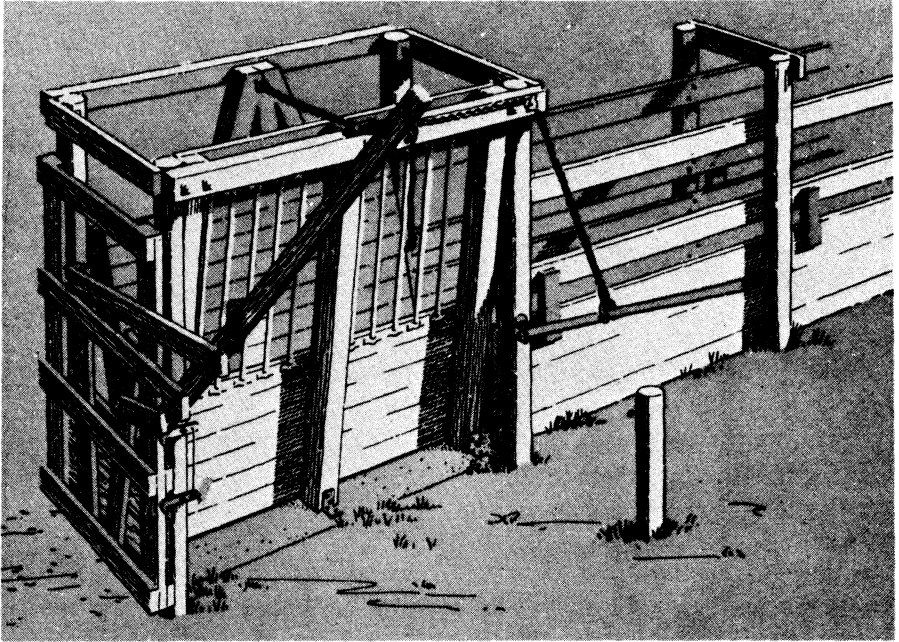


Figure 15.—Squeeze chute with headgate. This type of chute is suitable for dehorning. BN-11570-X

close examination, surgical operations, securing blood samples, internal treatment, and branding may require more complete restraint than is possible in a standard chute. In such cases, a squeeze chute located at the terminal end of the standard working chute is most desirable.

Many commercial beef cattle equipment companies specialize in designing and building sturdy, fast-acting, all-metal squeeze chutes. These are needed for large cattle operations, but for smaller farm herds a safe squeeze chute and headgate can be constructed from wood.

A chute built with a side exit gate is convenient. When animals

go down in the chute the side exit permits the freeing of the animal with a minimum of effort.

Loading Chute

The modern beef animal may travel as much as 2,000 miles from place of birth to where it is finally processed. It is frequently loaded and unloaded from transportation equipment; therefore, a safe, sturdy, well-lighted, easily accessible loading chute is a very essential part of beef cattle equipment. The loading chute can be portable; however, a permanent chute with ample room for easy truck approach on an

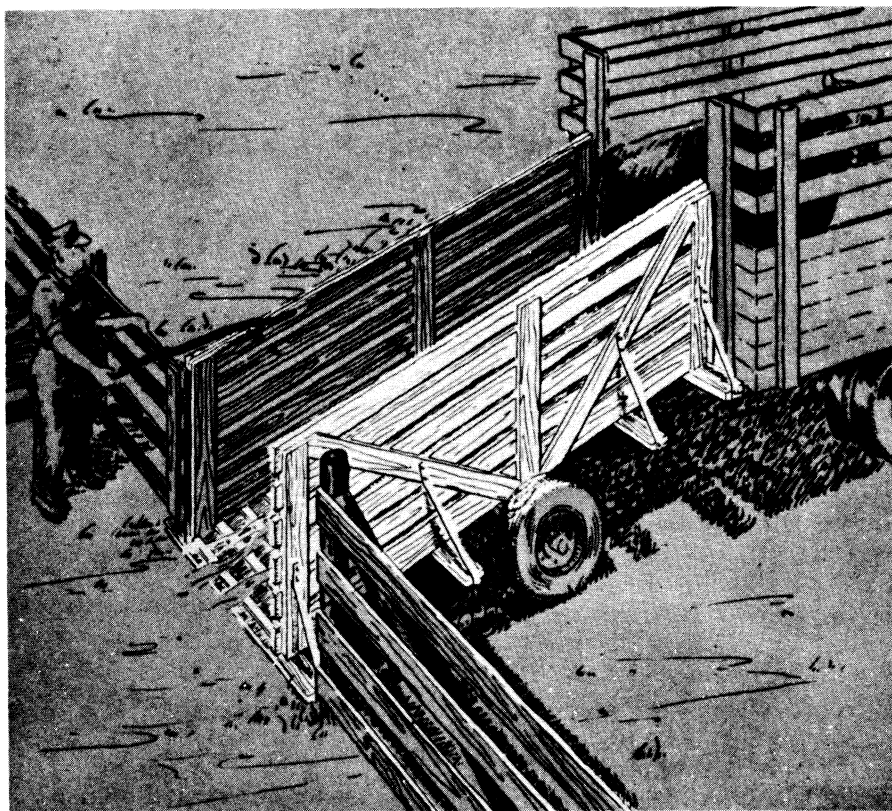


Figure 16.—Portable loading chute.

all-weather road surface is more functional.

A loading chute is commonly constructed with wood. The ramp should have two layers of dimension lumber with cleats placed 6 to 8 inches apart to prevent animals from slipping or falling. A concrete dock with an earthen ramp makes a very satisfactory loading chute. Animals will lead much more rapidly walking up the earth-filled ramp.

Good beef cattle equipment, well maintained, will provide safe working conditions for both the operator and the livestock. Like-

wise, good equipment will make the cattle operation more efficient and provide the operator with greater personal satisfaction.

CONTROL OF RUNOFF FROM FEEDLOTS

Runoff control for a feedlot is an important consideration in planning. Your State and Federal Environmental Protection Agency should be consulted when planning a new feedlot to ascertain that run-off control regulations are adequately met. A heavy run-

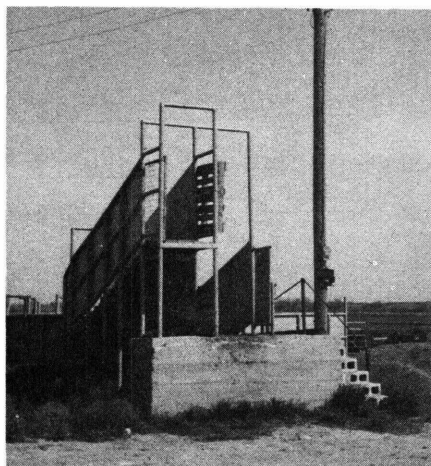


Figure 17.—Metal and concrete loading chute. ²⁹¹⁸

off or rainwater carries dissolved and suspended solids from the feedlot which can pollute lakes, rivers, or ground water supplies.

These environmental problems may include nitrate contamina-

tion of ground water, over-fertilization of lakes causing weed growth, fish kills because of a reduction of oxygen in lakes or streams, and spoil swimming and other water activities.

A feedlot should be constructed in such a way that the runoff can be trapped before it gets to a water supply.

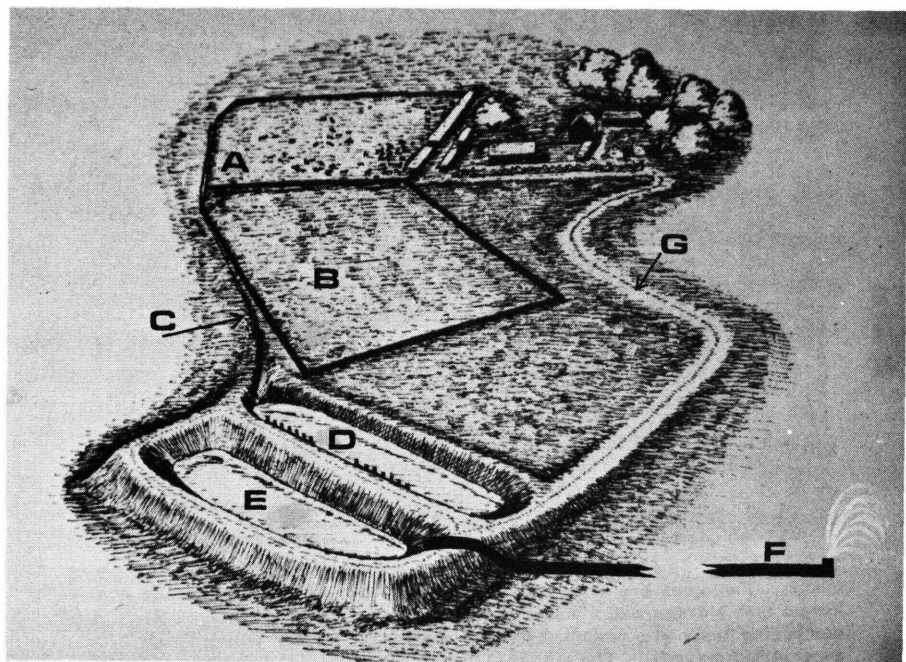
Runoff from above the feedlot because of snow melt or heavy rainfall should be diverted around the feedlot so that there will be less feedlot runoff water to be stored and handled.

Generally, to utilize feedlot runoff, the liquid from the holding basin is applied to cropland by irrigating or by hauling in a liquid manure tank wagon. This procedure empties the holding basin to be ready for the next runoff event and makes use of the nutrients for a growing crop.



Figure 18.—Concrete loading platform with metal evener.

BN-39367



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This is a feedlot design using various components. There are many other possible designs depending on the particular site chosen. The components can be identified as follows: A, Feedlot, well drained; B, Area to allow for future expansion of feedlot; C, Channel for carrying runoff to solids settling channel; D, Solids settling channel; E, Holding basin; F, Irrigation of liquid in holding basin onto surrounding cropland; and G, Diversion embankment to prevent runoff above the feedlot from going through the feedlot.

Various means of irrigating are available — hand-carried sprinkler, traveling gun, towline, solid set, side roll, boom, and center pivot. Each one of these has its advantages and disadvantages concerning labor and management required, operating cost, initial investment, and flexibility for expansion. Two basic types of gravity irrigation systems can be used—gated pipe and open ditches. For equipment recommendations, contact an irrigation engineer at your State university

agricultural engineering department.

To ascertain the proper design and size of the holding basin for your particular soil type and climatic region contact the local county Soil Conservation Service (SCS) office.

During a heavy runoff event, soil and animal waste solids will move off the feedlot. To prevent excessive buildup of these solids in the holding basin it may be desirable to construct a solids settling channel before the holding

basin. This will provide an area for the solids to settle out before they get to the holding basin.

A settling channel requires cleaning. The bottom of the settling channel should be constructed of concrete because the solids in the channel dry out quite slowly and a dirt bottom will impede wheeled vehicles. The selection and design of feeding, housing, handling facilities, and structures are largely based on operator preference and the requirements of the animals. The waste management and pollution control practices are controlled by Federal, State, and local regulations.

When designing a feedlot, consider the following points in management of animal waste—

- Contact your State pollution control agency to get a request for a permit. If the State agency does not require a permit, con-

tact should be made through the U.S. Environmental Protection Agency (EPA). There may be a requirement for a permit depending on the size of the animal feedlot.

- Contact your local SCS office for their advice on size and location of the holding basin and feedlot.

- Consider the location of any waterways and wells when choosing location of a feedlot. Soil type, distance to ground water supply, and slope of land also need to be considered.

- Remove animal waste solids from the surface of the feedlot at least once per year.

- Design settling channel to allow solids to dry out and be removed with conventional farm equipment such as a tractor with a front-end loader and a manure spreader.

- Pump out the holding basin as necessary.